Abstract

Thesis: Group-Based Sudoku-Pair Latin Squares

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Pages: 47

Let a and b be positive integers, an $(a, b)-$sudoku-pair Latin square is a Latin square of order ab with an additional property that there is no repetition of symbols in any canonical $a \times b$ and $b \times a$ tiling region. It is currently unknown whether a sudoku-pair Latin square exists for every pair of integers a and b. In this thesis I provide two group-theoretic construction methods to help us get closer to solving this open problem. This also allows us to create many concrete examples.

One construction will produce sudoku-pair Latin squares of order ab when $a|b$. The second construction will produce, under a few constraints, sudoku-pair Latin squares when a and b are relatively prime. In order to accomplish this latter task, a new idea called the *gnomon condition* is presented, which is a tool that gives the ability to confirm a valid sudoku-pair Latin square without needing to check the entire grid.